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[33] **South Africa**
[31] **67/7489**

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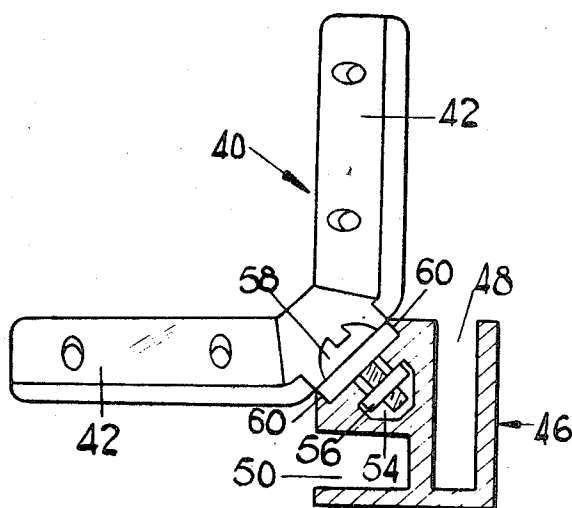
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[54] **JOINTS BETWEEN STRUCTURAL MEMBERS**
1 Claim, 7 Drawing Figs.

[52] **U.S. Cl.**..... **287/54,**
287/189.36
[51] **Int. Cl.**..... **F16b 7/00**
[50] **Field of Search**..... **287/189.36**
H, 20.92 D, 54 B

ABSTRACT: A joint between structural members such as edge members of panelled furniture, the joint being secured by a bracket having leaves which each abut and are secured to one of the structural members. The leaves each have an axis and the axes intersect to define a plane, the faces of the leaves abutting the structural members being obliquely inclined to that plane.



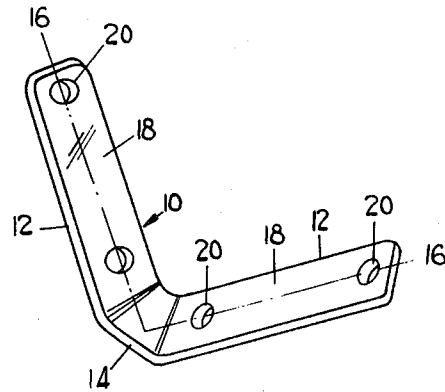


Fig. 1

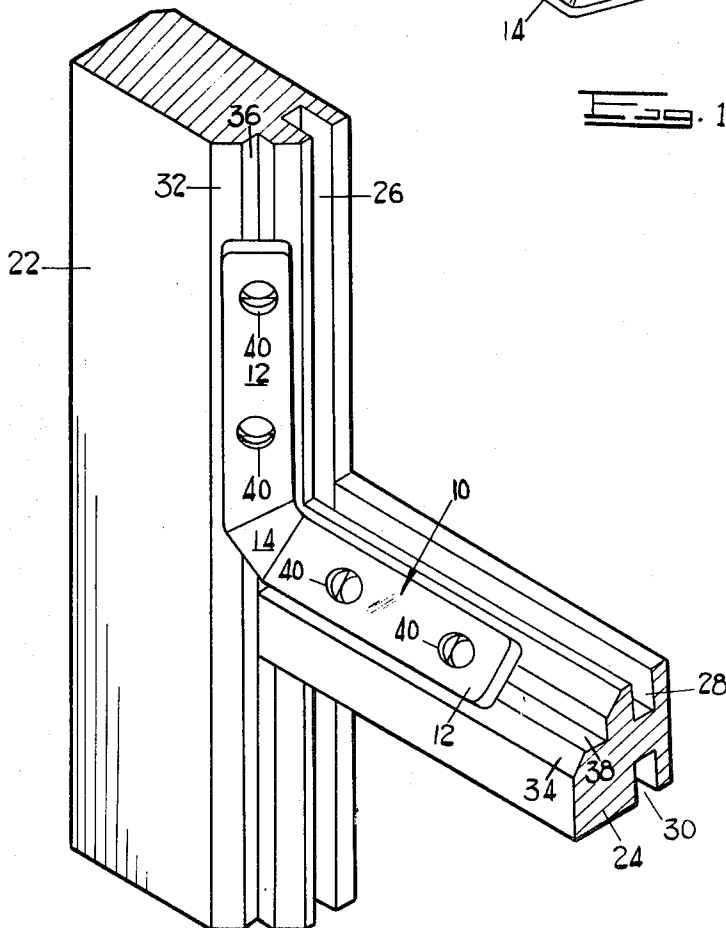


Fig. 2

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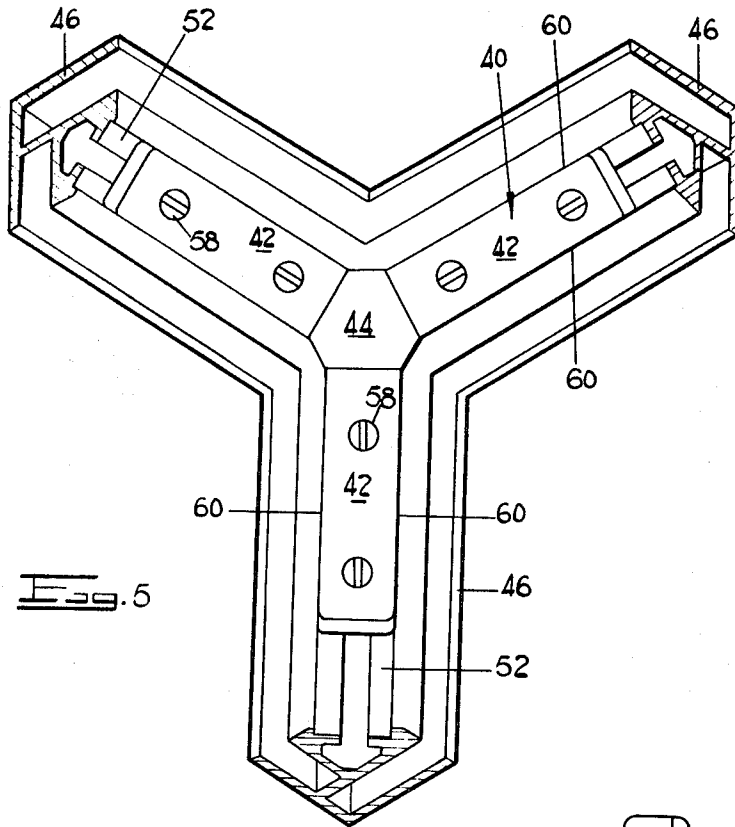


Fig. 5

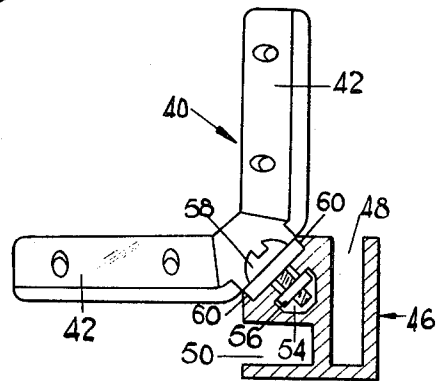


Fig. 4

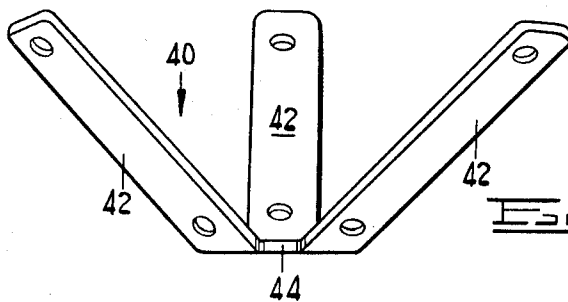
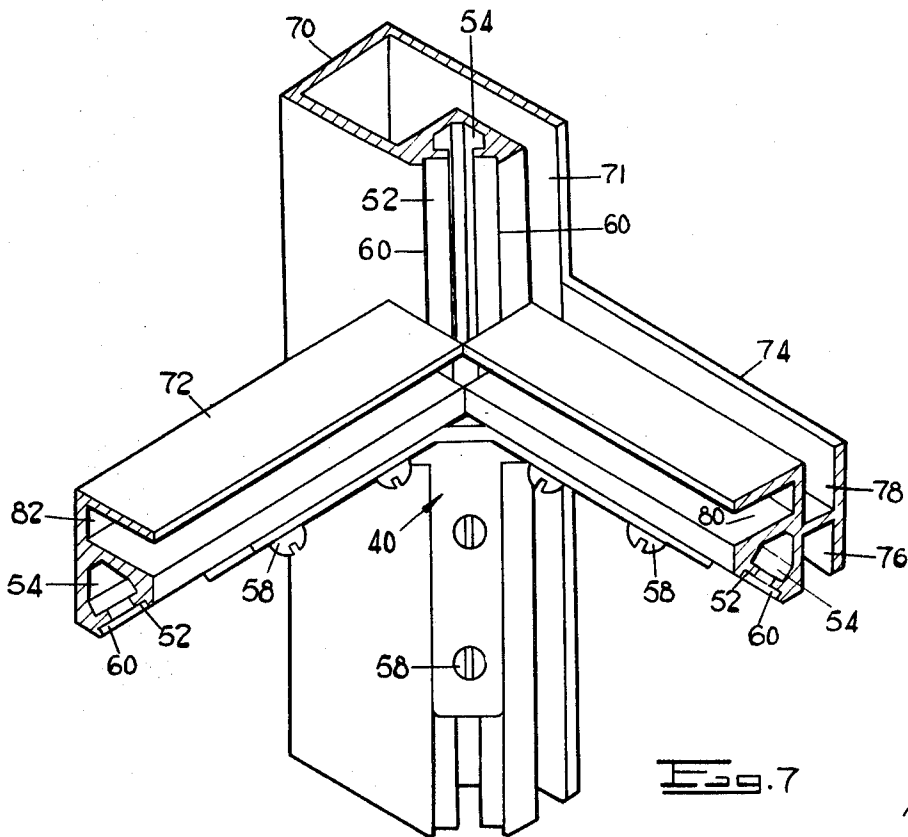
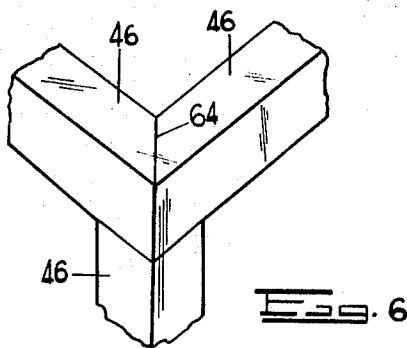


Fig. 3

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JOINTS BETWEEN STRUCTURAL MEMBERS

This invention relates to joints between structural members such as framework members of articles of furniture, and particularly to joints between two or three mutually perpendicular members.

The jointing of structural members of this type, whether of metal or timber, is traditionally a task calling for a skilled craftsman. In an age when craftsmen are becoming scarce and "do-it-yourself" systems have an enormous following, much attention has been paid to the simplification of traditional joints. Several systems have emerged in recent times to enable the amateur joiner or cabinetmaker or metalworker to make technically sound jointed articles with the minimum of training, skill, labor and equipment. As far as the applicant is aware, however, no fully satisfactory proposal has yet been made for the simplified jointing of structural members that are intended to support the edges of panels.

An object of this invention is to provide a novel simplified jointing system for angularly inclined structural members, whether of metal, timber, plastics or other material, and a novel bracket for use in the joint. The system is particularly suitable for joints between panel-supporting members, although it is also useful in other contexts.

According to one aspect of the invention, a bracket for use in a joint between two juxtaposed angularly inclined structural members comprises two angularly inclined leaves, each leaf having an axis and a face adapted to abut a surface of one of the structural members, the axes of the leaves intersecting to define a plane and the faces of the leaves each having a generally oblique inclination to that plane; and means connecting the leaves to hold them in position relatively to each other.

The bracket may also include means for attaching the leaves to the structural members.

Another aspect of the invention provides a jointed structure comprising a plurality of juxtaposed angularly inclined structural members, the joint between the members being secured by a bracket as described above with a face of each leaf of the bracket abutting and being secured to a surface of a structural member.

The structural members preferably have surfaces complementary to the leaf faces, and formations to inhibit movement of the bracket leaves out of position.

In a preferred form, the faces of the bracket leaves are flat and are each inclined at substantially 45° to the plane defined by the axes of the leaves. Where the structural members are to be joined at right angles to each other, the leaf faces are mutually perpendicular. The leaves are elongated, and are pierced to accommodate screws or the like for attachment to the structural members. The bracket is formed of pressed steel plate or some other stiff material. The leaves do not converge to a point, being connected by an expanse of the plate inclined to each of the leaves and extending across the included angle between their axes.

For use in a joint between three structural members, the bracket includes a third leaf corresponding to the other leaves, for secular to a surface of the third structural member. Where the joint encompasses three mutually perpendicular members, the leaf axes will also be mutually perpendicular. Various embodiments of the invention are described below with reference to the accompanying drawings, in which:

FIG. 1 is an isometric view of a two-leaf bracket for use in a joint between two mutually perpendicular structural members;

FIG. 2 is an isometric view of the bracket of FIG. 1 in place in a completed joint between two edge members of a type suitable for use in panelled furniture;

FIG. 3 is an isometric view of a three-leaf bracket for use in a joint between three mutually perpendicular structural members;

FIG. 4 is a sectional view through a preferred form of structural member to which one leaf of the bracket of FIG. 3 has been attached;

FIG. 5 is an isometric view of a completed joint incorporating the bracket of FIGS. 3 and 4, the joint forming a corner of a framework for a panelled article of furniture;

FIG. 6 is a perspective view from above of the joint of FIG. 5; and

FIG. 7 is an isometric view of another joint using the three-leaf bracket of FIGS. 3 and 4, the joint forming a corner of a framework of an article of furniture incorporating a shelf.

A preferred form of bracket is shown in FIG. 1. It is designed for use between two mutually perpendicular structural members, and is formed by cutting and pressing from steel plate of suitable thickness to make the finished joint rigid. The bracket, indicated generally at 10, comprises two identical leaves 12, 12, connected by a bridge portion 14. The leaves are of constant cross section except at their rounded ends, and have axes 16, 16, shown in dotted lines, that intersect to define a plane. The leaves are so formed that their flat surfaces are each inclined at an angle of 45° to the plane defined by the axes 16, 16. At the same time, the corresponding flat surfaces of the two leaves are mutually perpendicular. Thus the flat surfaces seen at 18, 18, in FIG. 1 are mutually perpendicular.

Each leaf is bored at 20 to provide holes for securing bolts or screws or the like.

FIG. 2 shows the bracket 10 of FIG. 1 installed in a T-joint between a vertical structural member 22 and a horizontal member 24. The members 22, 24 are in this instance wooden laths shaped by spindling or the like to the required section. In the drawing, the joint is intended to accommodate panels above and below the member 24, and grooves 26, 28 and 30 are provided to receive the edges of these panels and hold them securely.

Each of the members 22, 24 is provided with a surface against which the operative face of a leaf 12 is adapted to abut. On the member 22, this surface is shown as the 45° bevel 32. On the horizontal member 24 the surface is shown as the bevel 34. Each of the surfaces has a groove running centrally along its length to facilitate location of the bracket 10, the groove being shown at 36 on the surface 32, and at 38 on the surface 34.

Screws 40 extend through the holes 20 (invisible in FIG. 2) into the members 22 and 24 to hold the bracket 10 in place.

The bridge portion 14 of the bracket 10 eliminates a sharp corner between the leaves 12, 12, spanning the included angle between them. This blunting, as it were, of the bracket apex or corner simplifies manufacture of the bracket and also prevents cluttering of the space in the shoulder of the joint, where any slight inaccuracy in the bracket surface on the structural members might otherwise leave unsightly and undesirable gaps.

In practice, the joint shown in FIG. 2 might exist in any of many articles of panelled domestic or other furniture, or even in cabinets or shelving or other fitting for shops, warehouses, laboratories, and so on.

Where three mutually perpendicular members are to be connected in a joint, a three-leaved bracket of the kind shown in FIG. 3 is preferred. The bracket 40 of FIG. 3 is in effect a development of the bracket 10 of FIG. 1, having three identical and symmetrically arranged leaves, 42, 42, 42 similar to the leaves 12 in FIG. 1. A bridge portion 44 connects the leaves 42 together, again eliminating a sharp apex or corner.

In practice the plane of the bridge 44 is inclined at an angle of approximately 54° to the planes of the surfaces of each of the leaves 42, this angle conferring the required symmetry and locating the leaves properly for a joint of three mutually perpendicular structural members.

FIG. 4 shows the bracket 40 of FIG. 3 connected to a preferred form of structural member according to the invention, this member being an extruded section of aluminum or the like shown at 46. The section 46 is designed particularly as an edge member for panelled furniture, and has grooves 48, 50 to receive the edges of panels (not illustrated). The edge of the member 46 between the grooves 48, 50 is cut away to define a groove to receive one of the leaves of the bracket 40.

The floor 52 of this groove is formed with an undercut cavity 54 which receives the shanks of bolts 58 and square nuts 56 engaging the bolt shanks, the bolts 58 serving to hold the bracket 40 rigidly in place on the member 46.

Transverse movement of the leaf 12 is prevented independently of the bolts 58 by shoulders 60 on the member 46 flanking the groove floor 52. The bracket is initially brought into place by screwing the nuts 56 on to the ends of the shanks of the bolts 58, and sliding leaf 12 longitudinally along the groove with the nuts in the undercut cavity 54, and tightening up the bolts only when it is correctly located. The nuts 56 are of a size to be held against rotation in cavity 54. The bridge 44 is so shaped and inclined that the bracket is freely slidable along the groove of the member 46, and in the completed joint, clears the shoulders 60 adequately.

FIG. 5 shows a bracket 40 in place in a joint between three structural members 46 forming the corner of a framework for a panelled article of furniture or the like. Each leaf is held with its outer flat face abutting the groove floor surface 52 and shoulders 60 of a member 46, with bolts 58 locking the assembled joint rigidly together. The bridge portion 44 covers the apex of the joint.

FIG. 6 shows a view from above of the joint of FIG. 5. To form it neatly, it is preferred to cut two of the members 46, in practice those that extend horizontally in the finished article, at a 45° angle, the junction of these members being shown by the line 64. The vertical member 46 is cut square, to abut square-on against the other members 46. With accurate cutting and assembly, the joint lines are barely noticeable in the finished framework.

A different application of the bracket 40 of FIGS. 3 to 6 is shown in FIG. 7. Here there is a sturdy vertical structural member 70, such as might form a floor-to-ceiling post for built-in wall furniture. A groove 71 is provided in the member 70 to receive panels (not illustrated). Two horizontal members 72 and 74, of differing section, are joined to the member 70. The member 74 has three panel-receiving grooves 76, 78 and 80, while the member 72 has a single panel-receiving groove 82.

Each of the members 70, 72 and 74, which are conveniently extruded aluminum sections, has a cutaway corner formed with a groove floor 52 and shoulders 60, as described in relation to the members 46 of FIGS. 4 to 6. The joint between these members is supported by a three-leaved bracket 40 of the kind shown in FIGS. 3 to 6, and bolts 58 engaging nuts (not visible) in the cavities 54 of the members. As illustrated, the joint is suitable for the framework of an article of furniture or shop fitting or the like in which a horizontal shelf or panel is required between the members 72 and 74, and vertical panels between the members 70 and 74, both above and below the level of the member 74. These panels are not illustrated, but

would be held in the grooves of the structural members, being wedged in the grooves if necessary.

Where it is undesirable to have exposed bevelled surfaces, such as the grooved cutaway corner of the member 46 in FIGS. 4 to 6, a closure strip can be unobtrusively secured to the member to cover the surface.

While structural members that are elongated and of uniform cross section have been described and illustrated, they need not be so; they may indeed be members of bulky or blocky shape. Nor need they be of wood or metal, as other materials such as hard plastics are suitable.

With certain structural members, instead of securing the brackets by screws or bolts, spikes or like protrusions might be provided to be impressed into the body of the structural members; or self-tapping screws might be used. Other connection means are also feasible.

One of the main advantages of the system described above is that the joint can be made solely along surfaces of the structural members such as bevels, leaving the adjoining surfaces unencumbered. Where panels are used, these adjoining surfaces can be grooved or rebated without interference from the bracket, allowing neatness in the finished joint.

Another advantage is the simplicity of assembly. With structural members and brackets as described in this specification, only a screwdriver is needed to assemble what may be a complex piece of furniture or shop fitting or the like; provided, of course, that the structural elements have been cut to the correct dimensions. Costly and elaborate jointing tools, and even glue, are totally eliminated. Ease of dismantling, of course, matches ease of assembly.

Another advantage is the rigidity of the joint, which results not from direct interengagement of the structural members but from the rigidity of the bracket connecting them. The joint remains rigid even if there are inaccuracies in the dimensions of the structural members.

I claim:

1. The combination of a plurality of elongated members and a bracket connecting the members so that they lie at inclined positions, the bracket having a plurality of mutually inclined leaves which are stopped short of the point of intersection and a bridge which spans the included angle between them, the leaves having openings therein and the leaves and the bridge lying in a space bounded by the outer surfaces of the leaves, each member comprising a front part and reentrant means behind the front part, the reentrant means having an outwardly directed surface against which a leaf lies, a space located below the surface and a passage passing from the space to the surface, the combination further comprising, for each leaf, clamping means passing through the leaf openings and the passage in the associated member and having head means located respectively within the space and above the leaf.

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